

WHAT IS CLAIMED IS:

1. A method of removing cells from a skin portion of a subject inflicted with a dermatological lesion, comprising the steps of:
  - (a) providing a first reservoir containing a solution containing an effective amount of at least one protease;
  - (b) providing an applicator in fluid communication with said first reservoir, for restricting streaming of said protease solution, over, and in contact with, the skin portion;
  - (c) receiving said protease solution from said first reservoir, via an inlet port of said applicator;
  - (d) directing said streaming of said protease solution from said inlet port to a treatment zone of the skin portion, via a first tube structure of said applicator operatively connected to said inlet port, such that said streaming protease solution enzymatically and mechanically causes the removal of cells from the skin portion;
  - (e) adjustably directing said streaming protease solution and said removed cells away from said treatment zone via a second tube structure positioned within said first tube structure, wherein a screw mechanism operatively connected to said second tube structure allows adjustment of height of opening of said second tube structure with respect to a skin-facing opening of said treatment zone; and
  - (f) removing said streaming protease solution and said removed cells from said second tube structure, via an outlet port operatively connected to said second tube structure, thereby removing the cells from the skin portion of the subject.
2. The method of claim 1, wherein said at least one protease is selected from the group consisting of vibriolysin, krill protease, chymotrypsin, trypsin, collagenase, clastase, dipase, proteinase K, *Clostridium* multifunctional protease and *Bacillus subtilis* protease.

40

3. The method of claim 1, wherein said solution contains a single protease.
4. The method of claim 1, wherein said solution contains a plurality of proteases.
5. The method of claim 1, wherein said solution further contains an effective amount of at least one substance selected from the group consisting of a local anesthetic, a coagulant and an anti-coagulant.
6. The method of claim 1; wherein said solution further contains an effective amount of an antibiotic.
7. The method of claim 1, wherein said at least one protease is activated shortly prior to said streaming of said protease solution, over, and in contact with, the skin portion.
8. The method of claim 7, wherein said at least one protease is activated by a method selected from the group consisting of:
  - keeping said at least one protease at a first temperature in which said at least one protease is substantially catalytically inactive and heating and/or cooling said at least one protease to a second temperature in which said at least one protease is catalytically active,
  - providing said at least one protease in a powder form and mixing said powder with a solution in which said at least one protease is catalytically active, and
  - providing said at least one protease in a first solution in which said at least one protease is substantially catalytically inactive and mixing said first solution with a second solution so as to achieve a mixed solution in which said at least one protease is catalytically active.
9. The method of claim 8, wherein said mixed solution differs from said first solution by at least one parameter selected from the group consisting of pH, ion concentration, free metal concentration, hydrophilicity and hydrophobicity.

41

10. The method of claim 1, wherein said dermatological lesion is selected from the group consisting of warts, lentigines, melasmas, acne, keratoses, nevi, keloids, hypertrophic scars, psoriasis and tattoos.

11. The method of claim 1, further comprising the step of:

(g) collecting said streaming protease solution and said removed cells exiting said outlet port.

12. The method of claim 11, wherein said collecting said removed cells is effected via filtration.

13. The method of claim 11, wherein said collecting said removed cells is effected via continuous flow centrifugation.

14. A method of removing cells from the surface of a viable tissue of a subject, comprising the steps of:

- (a) providing a first reservoir containing a solution containing an effective amount of at least one protease;
- (b) providing an applicator in fluid communication with said first reservoir, for restricting streaming of said protease solution, over, and in contact with, the surface of the viable tissue;
- (c) receiving said protease solution from said first reservoir via an inlet port of said applicator;
- (d) directing said streaming of said protease solution from said inlet port to a treatment zone of the surface of the viable tissue, via a first tube structure of said applicator operatively connected to said inlet port, such that said streaming protease solution enzymatically and mechanically causes the removal of cells from the surface of the viable tissue;
- (e) adjustably directing said streaming protease solution and said removed cells away from said treatment zone via a second tube structure positioned within said first tube structure, wherein a screw mechanism operatively connected to said second tube structure allows adjustment of height of opening of said

second tube structure with respect to a skin-facing opening of said treatment zone; and

- (f) removing said streaming protease solution and said removed cells from said second tube structure, via an outlet port operatively connected to said second tube structure, thereby removing the cells from the surface of the viable tissue of the subject.

15. The method of claim 14, wherein said at least one protease is selected from the group consisting of vibriolysin, krill protease, chymotrypsin, trypsin, collagenase, elastase, dipase, proteinase K, *Clostridium* multifunctional protease and *Bacillus subtilis* protease.

16. The method of claim 14, wherein said solution contains a single protease.

17. The method of claim 14, wherein said solution contains a plurality of proteases.

18. The method of claim 14, wherein said solution further contains an effective amount of at least one substance selected from the group consisting of a local anesthetic, a coagulant and an anti-coagulant.

19. The method of claim 14, wherein said solution further contains an effective amount of an antibiotic.

20. The method of claim 14, wherein said at least one protease is activated shortly prior to said streaming of said protease solution, over, and in contact with, the surface of the viable tissue.

21. The method of claim 20, wherein said at least one protease is activated by a method selected from the group consisting of:

keeping said at least one protease at a first temperature in which said at least one protease is substantially catalytically inactive and heating and/or cooling said at least one protease to a second temperature in which said at least one protease is catalytically active,

providing said at least one protease in a powder form and mixing said powder with a solution in which said at least one protease is catalytically active, and

providing said at least one protease in a first solution in which said at least one protease is substantially catalytically inactive and mixing said first solution with a second solution so as to achieve a mixed solution in which said at least one protease is catalytically active.

22. The method of claim 21, wherein said mixed solution differs from said first solution by at least one parameter selected from the group consisting of pH, ion concentration, free metal concentration, hydrophilicity and hydrophobicity.

23. The method of claim 14, further comprising the step of:

(g) collecting said streaming protease solution and said removed cells exiting said outlet port.

24. The method of claim 23, wherein said collecting said removed cells is effected via filtration.

25. The method of claim 23, wherein said collecting said removed cells is effected via continuous flow centrifugation.

26. A device for removing cells from a skin portion of a subject, comprising:

(a) a first reservoir containing a solution containing an effective amount of at least one protease; and

(b) an applicator in fluid communication with said first reservoir, for restricting streaming of said protease solution, over, and in contact with, the skin portion, said applicator includes:

(i) an inlet port for receiving said protease solution from said first reservoir;

- (ii) a first tube structure operatively connected to said inlet port for directing said streaming of said protease solution from said inlet port to a treatment zone of the skin portion, such that said streaming protease solution enzymatically and mechanically causes the removal of cells from the skin portion;
- (iii) a second tube structure positioned within said first tube structure for adjustably directing said streaming protease solution and said removed cells away from said treatment zone, wherein a screw mechanism operatively connected to said second tube structure allows adjustment of height of opening of said second tube structure with respect to a skin-facing opening of said treatment zone; and
- (iv) an outlet port operatively connected to said second tube structure for removing said streaming protease solution and said removed cells from said second tube structure, thereby removing the cells from the skin portion of the subject.

27. The device of claim 26, further comprising a pump for effecting said streaming of said protease solution from said first reservoir to said applicator.

28. The device of claim 26, wherein said streaming of said protease solution from said first reservoir to said applicator is effected by gravitation.

29. The device of claim 26, further comprising a thermoregulator for heating and/or cooling said protease solution.

30. The device of claim 26, further comprising a mixer for mixing said protease solution.

31. The device of claim 26, further comprising a filter for filtering said protease solution.

45

32. The device of claim 26, further comprising:  
a second reservoir containing said at least one protease in a first solution in which  
said at least one protease is substantially catalytically inactive; and  
a third reservoir containing a protease activating solution, said activating solution  
activates catalytic activity of said at least one protease upon mixing with said first solution;  
said second reservoir and said first reservoir are in fluid communication with said  
third reservoir.

33. The device of claim 26, further comprising a second reservoir for containing  
a protease activating solution, said activating solution activates catalytic activity of said at  
least one protease upon mixing therewith.

34. The device of claim 26, further comprising a cell collector in fluid  
communication with said applicator, for receiving said streaming protease solution and said  
removed cells from said outlet port.

35. The device of claim 34, wherein said cell collector comprises a filter for  
collecting said removed cells from the skin portion of the subject.

36. The device of claim 34, wherin said cell collector comprises a continuous  
flow centrifuge for collecting said removed cells from the skin portion of the subject.

37. The device of claim 26, further comprising an engaging mechanism for  
engaging said applicator to the skin portion of the subject.

38. The device of claim 26, further comprising a receptacle for receiving said  
first reservoir.

39. A device for removing cells from a skin portion of a subject, comprising:  
(a) a first reservoir containing a first solution containing an effective amount of  
at least one protease in a substantially catalytically inactive form;  
(b) a first receptacle for receiving said first reservoir;

- (c) a second reservoir containing a protease activating solution, said activating solution activates catalytic activity of said at least one protease upon mixing with said first solution;
- (d) a second receptacle for receiving said second reservoir;
- (e) a mixing chamber in fluid communication with said first and second reservoirs when received by said first and second receptacles, said mixing chamber is for mixing said first solution and said activating solution such that said at least one protease becomes catalytically active in solution;
- (f) an applicator in fluid communication with said mixing chamber, for restricting streaming of said active protease solution, over, and in contact with, the skin portion, said applicator includes:
  - (i) an inlet port for receiving said active protease solution from said mixing chamber;
  - (ii) a first tube structure operatively connected to said inlet port for directing said streaming of said active protease solution from said inlet port to a treatment zone of the skin portion, such that said streaming active protease solution enzymatically and mechanically causes the removal of cells from the skin portion;
  - (iii) a second tube structure positioned within said first tube structure for adjustably directing said streaming active protease solution and said removed cells away from said treatment zone, wherein a screw mechanism operatively connected to said second tube structure allows adjustment of height of opening of said second tube structure with respect to a skin-facing opening of said treatment zone; and
  - (iv) an outlet port operatively connected to said second tube structure for removing said streaming active protease solution and said removed cells from said second tube structure, thereby removing the cells from the skin portion of the subject.

40. The device of claim 39, further comprising a pump for effecting said streaming of said active protease solution from said mixing chamber to said applicator.

41. The device of claim 39, wherein said streaming of said active protease solution from said mixing chamber to said applicator is effected by gravitation.

42. The device of claim 39, further comprising a thermoregulator for heating and/or cooling said active protease solution.

43. The device of claim 39, further comprising a mixer for mixing said active protease solution.

44. The device of claim 39, further comprising a filter for filtering said active protease solution.

45. The device of claim 39, further comprising a cell collector in fluid communication with said applicator, for receiving said streaming protease solution and said removed cells from said outlet port.

46. The device of claim 45, wherein said cell collector comprises a filter for collecting said removed cells from the skin portion of the subject.

47. The device of claim 45, wherein said cell collector comprises a continuous flow centrifuge for collecting said removed cells from the skin portion of the subject.

48. The device of claim 39, further comprising an engaging mechanism for engaging said applicator to the skin portion of the subject.

49. A device for removing cells from a skin portion of a subject, comprising:

- (a) a first reservoir containing an effective amount of at least one protease in a non-aqueous catalytically inactive form;
- (b) a first receptacle for receiving said first reservoir;

- (c) a second reservoir containing a protease activating solution, said activating solution activates catalytic activity of said at least one protease upon mixing with said at least one protease;
- (d) a second receptacle for receiving said second reservoir;
- (e) a mixing mechanism in fluid communication with said first and second reservoirs when received by said first and second receptacles, said mixing mechanism is for mixing said at least one protease and said activating solution such that said at least one protease becomes catalytically active in solution;
- (f) an applicator in fluid communication with said mixing mechanism, for restricting streaming of said active protease solution, over, and in contact with, the skin portion, said applicator includes:
  - (i) an inlet port for receiving said active protease solution from said mixing mechanism;
  - (ii) a first tube structure operatively connected to said inlet port for directing said streaming of said active protease solution from said inlet port to a treatment zone of the skin portion, such that said streaming active protease solution enzymatically and mechanically causes the removal of cells from the skin portion;
  - (iii) a second tube structure positioned within said first tube structure for adjustably directing said streaming active protease solution and said removed cells away from said treatment zone, wherein a screw mechanism operatively connected to said second tube structure allows adjustment of height of opening of said second tube structure with respect to a skin-facing opening of said treatment zone; and
  - (iv) an outlet port operatively connected to said second tube structure for removing said streaming active protease solution and said removed cells from said second tube structure, thereby removing the cells from the skin portion of the subject.

50. The device of claim 49, further comprising a pump for effecting said streaming of said active protease solution from said mixing mechanism to said applicator.

51. The device of claim 49, wherein said streaming of said active protease solution from said mixing mechanism to said applicator is effected by gravitation.

52. The device of claim 49, further comprising a thermoregulator for heating and/or cooling said active protease solution.

53. The device of claim 49, further comprising a mixer for mixing said active protease solution.

54. The device of claim 49, further comprising a filter for filtering said active protease solution.

55. The device of claim 49, further comprising a cell collector in fluid communication with said applicator, for receiving said streaming protease solution and said removed cells from said outlet port.

56. The device of claim 55, wherein said cell collector comprises a filter for collecting said removed cells from the skin portion of the subject.

57. The device of claim 55, wherein said cell collector comprises a continuous flow centrifuge for collecting said removed cells from the skin portion of the subject.

58. The device of claim 49, further comprising an engaging mechanism for engaging said applicator to the skin portion of the subject.

59. An applicator for removing cells from a skin portion of a subject, comprising:

- (a) an inlet port operatively connectable to a first reservoir containing a solution containing an effective amount of at least one protease, for being in

fluid communication with said first reservoir, for receiving said protease solution from said first reservoir;

- (b) a first tube structure operatively connected to said inlet port for directing streaming of said protease solution from said inlet port to a treatment zone of the skin portion, such that said streaming protease solution streams over, and in contact with, the skin portion, for enzymatically and mechanically causing the removal of cells from the skin portion;
- (c) a second tube structure positioned within said first tube structure for adjustably directing said streaming protease solution and said removed cells away from said treatment zone, wherein a screw mechanism operatively connected to said second tube structure allows adjustment of height of opening of said second tube structure with respect to a skin-facing opening of said treatment zone; and
- (d) an outlet port operatively connected to said second tube structure for removing said streaming protease solution and said removed cells from said second tube structure, thereby removing the cells from the skin portion of the subject.

60. The applicator of claim 59, wherein a pump is operatively connected between said first reservoir and said inlet port for effecting said streaming of said protease solution.

61. The applicator of claim 59, wherein said streaming of said protease solution from said first reservoir to said inlet port is effected by gravitation.

62. The applicator of claim 59, wherein a thermoregulator is operatively connected between said first reservoir and said inlet port for heating and/or cooling said protease solution.

63. The applicator of claim 59, wherein a mixer is operatively connected between said first reservoir and said inlet port for mixing said protease solution.

64. The applicator of claim 59, wherein a filter is operatively connected between said first reservoir and said inlet port for filtering said protease solution.

65. The applicator of claim 59, wherein, operatively connected between said first reservoir and said inlet port are:

a second reservoir containing said at least one protease in a first solution in which said at least one protease is substantially catalytically inactive; and

a third reservoir containing a protease activating solution, said activating solution activates catalytic activity of said at least one protease upon mixing with said first solution;

said second reservoir and said first reservoir are in fluid communication with said third reservoir.

66. The applicator of claim 59, wherein, operatively connected between said first reservoir and said inlet port is a second reservoir for containing a protease activating solution, said activating solution activates catalytic activity of said at least one protease upon mixing therewith.

67. The applicator of claim 59, wherein a cell collector is operatively connected to said outlet port, for receiving said streaming protease solution and said removed cells from said outlet port.

68. The applicator of claim 67, wherein said cell collector comprises a filter for collecting said removed cells from the skin portion of the subject.

69. The applicator of claim 67, wherein said cell collector comprises a continuous flow centrifuge for collecting said removed cells from the skin portion of the subject.

70. The applicator of claim 59, wherein an engaging mechanism is operatively connected to the applicator, for engaging the applicator to the skin portion of the subject.

71. The applicator of claim 59, wherein a receptacle is operatively connected to said first reservoir, for receiving said first reservoir.

72. An applicator for removing cells from the surface of a viable tissue of a subject, comprising:

- (a) an inlet port operatively connectable to a first reservoir containing a solution containing an effective amount of at least one protease, for being in fluid communication with said first reservoir, for receiving said protease solution from said first reservoir;
- (b) a first tube structure operatively connected to said inlet port for directing streaming of said protease solution from said inlet port to a treatment zone of the surface of the viable tissue, such that said streaming protease solution streams over, and in contact with, the surface of the viable tissue, for enzymatically and mechanically causing the removal of cells from the surface of the viable tissue;
- (c) a second tube structure positioned within said first tube structure for adjustably directing said streaming protease solution and said removed cells away from said treatment zone, wherein a screw mechanism operatively connected to said second tube structure allows adjustment of height of opening of said second tube structure with respect to a skin-facing opening of said treatment zone; and
- (d) an outlet port operatively connected to said second tube structure for removing said streaming protease solution and said removed cells from said second tube structure, thereby removing the cells from the surface of the viable tissue of the subject.

73. The applicator of claim 72, wherein a pump is operatively connected between said first reservoir and said inlet port for effecting said streaming of said protease solution.

74. The applicator of claim 72, wherein said streaming of said protease solution from said first reservoir to said inlet port is effected by gravitation.

75. The applicator of claim 72, wherein a thermoregulator is operatively connected between said first reservoir and said inlet port for heating and/or cooling said protease solution.

76. The applicator of claim 72, wherein a mixer is operatively connected between said first reservoir and said inlet port for mixing said protease solution.

77. The applicator of claim 72, wherein a filter is operatively connected between said first reservoir and said inlet port for filtering said protease solution.

78. The applicator of claim 72, wherein, operatively connected between said first reservoir and said inlet port are:

a second reservoir containing said at least one protease in a first solution in which said at least one protease is substantially catalytically inactive; and

a third reservoir containing a protease activating solution, said activating solution activates catalytic activity of said at least one protease upon mixing with said first solution; said second reservoir and said first reservoir are in fluid communication with said third reservoir.

79. The applicator of claim 72, wherein, operatively connected between said first reservoir and said inlet port is a second reservoir for containing a protease activating solution, said activating solution activates catalytic activity of said at least one protease upon mixing therewith.

80. The applicator of claim 72, wherein a cell collector is operatively connected to said outlet port, for receiving said streaming protease solution and said removed cells from said outlet port.

81. The applicator of claim 80, wherein said cell collector comprises a filter for collecting said removed cells from the surface of the viable tissue of the subject.

82. The applicator of claim 80, wherein said cell collector comprises a continuous flow centrifuge for collecting said removed cells from the surface of the viable tissue of the subject.

83. The applicator of claim 72, wherein an engaging mechanism is operatively connected to the applicator, for engaging the applicator to the surface of the viable tissue of the subject.

84. The applicator of claim 72, wherein a receptacle is operatively connected to said first reservoir, for receiving said first reservoir.

85. An applicator for streaming a solution over, and in contact with, a skin portion of a subject, the applicator comprising a housing having a skin-facing opening, at least one inlet and at least one outlet, said at least one inlet and said at least one outlet each providing a passageway for streaming of said solution therethrough and over the skin portion defined by said skin-facing opening, wherein an opening of at least one of said at least one inlet and said at least one outlet through which said solution streams is height adjustable with respect to said skin-facing opening, such that the applicator physically conforms to a non-smooth skin surface of the subject.

86. The applicator of claim 85, further comprising a screw mechanism for adjusting said height of a said opening with respect to said skin-facing opening.

87. The applicator of claim 85, wherein each said passageway is configured as a tube structure.

88. The applicator of claim 85, wherein a said outlet is positioned within a said inlet.

89. The applicator of claim 85, wherein said inlet is for adjustably directing streaming of a protease solution to a treatment zone of a surface of a viable tissue of the skin portion of the subject, such that said streaming protease solution streams over, and is

55

in contact with, said surface of said viable tissue, for enzymatically and mechanically causing removal of cells from said surface of said viable tissue of the skin portion of the subject.

90. The applicator of claim 85, wherein said outlet is for adjustably removing a streaming protease solution and removed cells from a surface of a viable tissue of the skin portion of the subject.

91. The applicator of claim 85, wherein each said opening of said at least one inlet and of said at least one outlet through which said solution streams is height adjustable with respect to said skin-facing opening.